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Norton Sound Shaktoolik and Unalakleet Subdistricts Chinook Salmon Stock Status and Action Plan, 2007; a Report to the Alaska Board of Fisheries

by

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and

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December 2006

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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The Division of Sport Fish Special Publications series was established in 1991 for the publication of techniques and procedures manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and other documents that do not fit in another publication series of the Division of Sport Fish. Since 2004, the Division of Commercial Fisheries has also used the same Special Publication series. Special Publications are intended for fishery and other technical professionals. Special Publications are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone editorial and peer review.

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In response to the guidelines established in the *Policy for Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222), the Alaska Board of Fisheries (BOF) classified the Norton Sound Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) Chinook salmon *Oncorhynchus tshawytscha* stock as a stock of concern, specifically a yield concern, at its January 2004 meeting. A "yield concern" is defined as, "a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs; a yield concern is less severe than a management concern". An action plan was developed by the Alaska Department of Fish and Game (ADF&G) and acted upon by the BOF in January 2004. The SSFP directs ADF&G to assess salmon stocks in areas addressed during the BOF regulatory cycle to identify stocks of concern and in the case of Norton Sound Subdistricts 5 and 6 Chinook salmon, to reassess the stock of concern status. Since that time, Chinook salmon yield in Subdistricts 5 and 6 has shown no improvement. The Subdistricts 5 and 6 Chinook salmon stock continues to meet the definition for a yield concern as defined in SSFP. Based on the definitions provided in the SSFP, ADF&G recommends continuing the stock of concern classification of the Subdistricts 5 and 6 Chinook salmon stock as a yield concern. Further, ADF&G is providing a draft management plan for the Subdistricts 5 and 6 Chinook salmon stock as part of the current action plan.

Key words: Norton Sound, Chinook salmon, *Oncorhynchus tshawytscha*, stock of concern, management concern, yield concern, commercial, fishing, ADF&G, sustainable salmon fisheries policy, Alaska Board of Fisheries.

INTRODUCTION

The *Policy for Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222, effective 2000, amended 2001) directs the Alaska Department of Fish and Game (ADF&G, department) to provide the Alaska Board of Fisheries (BOF) with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation during regular BOF meetings. This report provides ADF&G's reassessment of the Norton Sound Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) (Figure 1) Chinook salmon *Oncorhynchus tshawytscha* stock of concern, which has been classified as a yield concern.

A stock of yield concern is defined as "a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs; a yield concern is less severe than a management concern" (5 AAC 39.222(f)(42)). The SSFP further goes on to define chronic inability as "the continuing or anticipated inability to meet expected yields over a 4 to 5 year period". Therefore, in supporting analysis, only the most recent 5-year escapement performance history along with a comparison of the most recent 5-year yields or harvestable surpluses and a select 10-year historical level of yield or harvestable surpluses are primarily considered.

In response to the guidelines established in the SSFP (5 AAC 39.222), the BOF classified the Norton Sound Subdistricts 5 and 6 Chinook salmon stock as a yield concern at the January 2004 BOF meeting. An action plan was subsequently developed by the department (Jones 2003) and acted upon by the BOF in January 2004.

In response to the guidelines established in the SSFP 5 AAC 39.222, the department recommended continuing the designation of Norton Sound Subdistricts 5 and 6, Chinook salmon stock as a stock of yield concern at the October 2006 BOF work session. This recommendation as a yield concern was based on low harvests during the most recent 5-year period (2002–2006) compared to the historical average yield, as indicated by the 1989–1998 10-year average for commercial harvests. Subsistence harvest data have not been collected in some years, and varying methodology has been used to collect those data. Therefore, the historic baseline for comparison, the 10-year period from 1989–1998, cannot be used in this analysis. Instead, we

used the 5-year period from 1994–1998 for the yield analysis for subsistence harvests. During this period collection methodology was similar.

Although sport fish harvest information was collected from anglers on the Unalakleet by the department starting in 1983, catch and effort information is only available starting in 1990. Additionally, sport fish harvest, catch and effort information is not yet available for 2006. Therefore, the most recent 5-year period in which sport fish information is available, 2001–2005, is compared to the historic 10-year period 1990–1999. In the figures in this report, the previous 5-year average for the sport fish harvest is used as a preliminary estimate.

STOCK ASSESSMENT BACKGROUND

The Norton Sound District is composed of six commercial fishing subdistricts (Figure 1). Most subdistricts have several rivers where subsistence fishing occurs, and except for the Nome Subdistrict, there are few restrictions (Kohler et al. 2005). In Subdistrict 5 most freshwater subsistence fishing occurs in the Shaktoolik River and, in Subdistrict 6, in the Unalakleet River (Figure 1). Subdistricts 5 and 6 have been managed as one management unit or fishery, because past studies have shown salmon bound for these subdistricts intermingle and that harvests in the marine waters of each subdistrict most likely contain fish bound for both rivers.

ESCAPEMENT

There are two escapement assessment projects in Subdistrict 6 and none in Subdistrict 5. Additionally, Sustainable Escapement Goals (SEG) based on aerial survey data have been established for the Shaktoolik River and, within the Unalakleet River drainage, for the Old Woman River and Unalakleet River combined (ADF&G 2004). However, it is difficult to conduct aerial surveys under acceptable conditions on these rivers because of poor weather and poor river water clarity. Additionally, most recent surveys were conducted early in the migration, about 10 days earlier than previous surveys, in an attempt to avoid the bad weather and the large numbers of pink salmon that now spawn in these rivers later in the summer. Recent (2002–2006) aerial surveys conducted on both rivers have been rated poor or incomplete. Therefore, aerial survey data are only peripherally used in this analysis.

ADF&G operates a test net several miles upstream from the mouth of the Unalakleet River. Farther upstream on the North River, a salmon escapement counting tower is operated by the Native Village of Unalakleet. The North River tower count appears to be a good indicator of Chinook salmon abundance to the entire Unalakleet River drainage (Wuttig 1999).

Unalakleet River test net indices for Chinook salmon have improved during the last 2 years (Figure 2), but the North River Chinook salmon tower escapement goal has not been achieved since 2003 (Figure 3). In 1999 the Escapement Goal (EG) range of 1,200–2,400 was established for the North River[1]. In 2004, the goal was classified as an SEG and the upper range of the goal was changed to 2,600 salmon (ADF&G 2004). Chinook salmon escapement to the North River was within the SEG of 1,200–2,600 from 2001–2003, but was not achieved in 2004–2006 (Figure 3). During this time, Chinook salmon escapement to the North River fell short of the

[1] Fair, L., C. Lean, F. DeCicco, J. Magdanz, and R. McLean. Unpublished. Proposed salmon BEGs for Norton Sound and Kotzebue Sound. Alaska Department of Fish and Game, Division of Commercial Fisheries, 1999 Memorandum, Anchorage.

lower end of the SEG by 6%, 15%, and 25%, respectively. Interestingly, aerial survey counts of Chinook salmon in the Old Woman and Unalakleet River provide conflicting information, indicating that Chinook salmon escapements, in 2005, approached the low end of the SEG under poor survey conditions on the Unalakleet River (Figure 4). It is likely that if the survey was conducted under more favorable conditions, the SEG would have been achieved. Aerial survey counts within the Shaktoolik River during 2002–2006 have been rated as incomplete and poor because most of the surveys were only conducted on a portion of the river, did not represent an index of escapement to the river, and therefore, could not be compared to the SEG. Accordingly, these data were not used in this analysis.

YIELD

Commercial Chinook salmon harvests for Subdistricts 5 and 6 averaged 7,131 per year for the historical period 1989–1998 (Table 1 and Figure 5). This average declined to 36 Chinook per year for the recent 5 year period (2002–2006). This decrease represents more than a 99% decrease in commercial harvest (Table 1). The average combined subsistence harvest of 3,239 during the most recent 5-year period (2002–2006) represents a decline by approximately 29% from the average subsistence harvest of 4,553 Chinook salmon taken during the 1994–1998 period (Table 1; Figure 6). Additionally, subsistence fishers have indicated that they must invest more fishing time in recent years in order to meet their subsistence needs. Both the commercial and subsistence decreased harvest patterns were apparent in both subdistricts (Figure 7) and within each subdistrict individually (Figures 8 and 9).

The drastic decline in harvest represents the drastic decline in yields from this stock as the Chinook salmon run size decreased (Figure 10). Total run size during the period 1984–1986 and 1996–2006, assuming that 100% of the commercial and subsistence harvest in Subdistrict 6 (Unalakleet) originates in the Unalakleet River, ranged from 4,809 salmon in 2006 to 24,942 in 1997 (Table 4; Figure 10).

Sport fisheries have been active on the Unalakleet River for many years. The U.S. Air Force operated a recreational fishing camp on the river in the early 1960s, and a commercial sport fishing lodge was constructed on the river in the late 1960s. The lodge is still in operation but has changed owners and expanded. Between 1990 and 2005, the estimated sport fishing effort ranged from 2,153 angler days in 1993 to 8,195 in 2002 (Table 2). Chinook harvests have ranged from 97 fish in 2003 to 842 fish during 1997. The recent 5-year (2001–2005) average harvest of 293 Chinook was approximately 24% below the historic 10-year (1990–1999) average of 386 salmon (Table 2). However, average Chinook salmon catch, which includes fish that were released in addition to fish that were harvested, declined by approximate 40% during the same period. Average number of anglers and average number of trips increased slightly between the two periods, less than 1% and approximately 4%, respectively, while the average number of angler-days increased by approximately 32%. However, this increase can be mostly attributable to a dramatic increase in overall effort in one year, 2002. Sport fishing effort in the Shaktoolik River is very light to non-existent, and data are not available.

There have been no commercial fishing periods targeting Chinook salmon since 2001, except for two periods in 2005 (Table 3), which yielded a very small harvest. Additionally, subsistence fishing and sport fishing closures were implemented in 2003, 2004, and 2006 (Table 3) because of poor Chinook salmon test net catches in 2003 and 2004 (Figure 2) and low North River tower escapement counts in 2003–2004 and 2006 (Figure 3).

EXPLOITATION RATE

During the period where we can estimate total Chinook salmon run size to the Unalakleet River (1984–1986 and 1996–2006), Chinook salmon runs returning to the Unalakleet River have dramatically decreased (Figure 10). Accordingly, yields have precipitously declined. Because subsistence use is the priority consumptive use, commercial harvests have taken the brunt of this decrease. Total exploitation rates of Unalakleet River Chinook salmon ranged from 40.6% in 2001 to 79.4 % in 1985 (Table 5). Total exploitation rates have decreased approximately 7.3% from an average of 52.3% during the period 1997–2001 to 45.0% during the most recent 5-year average (2002–2006) (Table 5).

Exploitation rate of Chinook salmon by commercial fishing has ranged from 0.0% in 2004 to 70.5% in 1985 (Table 5; Figure 11). More recently, the commercial exploitation rate has decreased from an average of 20.6% for the period 1997–2001 to near zero, 0.5%, for the recent 5-year average (2002–2006) (Table 5). This dramatic decrease in the commercial harvest is directly attributable to the low run size of Chinook salmon returning to this drainage (Figure 10). Lack of escapement data for the years prior to 1984 and from 1987–1995 precludes calculation of total run and exploitation rates for those years.

Although subsistence harvests have also decreased in Subdistricts 5 and 6 over the last 13 years (Table 1; Figure 6), the decrease was not as dramatic as that of the commercial harvest. Exploitation rates for subsistence harvests have varied from 7.8% in 1985 to 44.9% in 2006 (Table 5; Figure 11). However, because of recent drastic reductions in the commercial harvest, subsistence exploitation rates have markedly increased (Figure 11), even with a substantial decrease in subsistence harvest. The recent 5-year average (2002–2006) exploitation rate by the subsistence fishery has increased 33.0% over the previous 5-year average (1997–2001; Table 5). The estimated exploitation of Chinook salmon in the Unalakleet River by sport fisheries has ranged from about 0.2% in 1984 to about 8.0% in 2002 with an overall average of 4.2% between 1996 and 2005 (Table 5; Figure 11). Exploitation by sport fishers has increased slightly from an average of 3.8% for the period 1997–2001 to 4.2% for the most recent 5-year average (2001-2005; Table 5).

STOCK OF CONCERN RECOMMENDATION

Given the chronic inability to maintain near average yields despite use of specific management measures, the Norton Sound Subdistricts 5 and 6 Chinook salmon stock continues to meet the criteria of a stock of yield concern. Therefore, based on the definitions provided in the *Policy for the Management of Sustainable Salmon Fisheries* in 5 AAC 39.222(f)(42), ADF&G recommends continuation of the yield concern classification for the Norton Sound Subdistricts 5 and 6 Chinook salmon stock. We will continue to monitor escapement and if escapements do not meet escapement goals during the next 3 years, the department will recommend a change of the classification to a management concern for this stock.

OUTLOOK

The 2007 Chinook salmon run in Norton Sound Subdistricts 5 and 6 should be similar to runs in recent years when no commercial fishing was allowed. However, if the Chinook salmon run is stronger than expected and escapement is projected to be met, commercial fishing will be allowed. Information from previous Bering-Aleutian Salmon International Survey (BASIS) studies and

trawl bycatch information indicate a high abundance of Chinook salmon in the Bering Sea. Depending on the origin of these salmon, the 2007 run may be larger than anticipated.

ALASKA BOARD OF FISHERIES ACTION

In response to the guidelines established in the *Policy for Management of Sustainable Salmon Fisheries*, the Alaska Board of Fisheries, during the January 31–February 5, 2007 regulatory meeting is anticipated to continue the classification of the Norton Sound Subdistricts 5 and 6 Chinook salmon stock as a yield concern.

ESCAPEMENT GOAL EVALUATION

ADF&G has undertaken a review of escapement goals for several Norton Sound salmon stocks where long-term escapement, catch, and age composition data exist that enable the development of biological escapement goals (BEG) or sustainable escapement goals (SEG) based on analysis of production consistent with the escapement goal policy. In 1999, ADF&G established Chinook salmon aerial survey escapement goals for the Shaktoolik, Unalakleet/Old Women, and North rivers. Additionally, an escapement goal for the North River tower was also established in 1999 [2]. It is difficult to obtain aerial survey counts for Chinook salmon from the Shaktoolik, Unalakleet/Old Woman, and North Rivers because of weather and river conditions and, more recently, the large number of pink salmon spawning in both rivers during the optimal aerial survey window of opportunity mask other species in the river, including Chinook salmon. Large numbers of pink salmon in the river preclude accurate counting of Chinook salmon from the air. A tagging study completed by the Division of Sport Fish in 1999 indicated the North River tower Chinook salmon count represents about 40% of the Chinook salmon escapement to the Unalakleet River Drainage (Wuttig 1999). In 2004, utilizing additional data since the escapement goal for the North River was established resulted in ADF&G establishing a SEG range of 1,200 to 2,600 Chinook salmon (ADF&G 2004). Escapement goals were reviewed in the 2007 BOF cycle utilizing additional data since the escapement goals were established. This evaluation resulted in no recommended changes (Brannian et al. 2006; Estensen and Evenson 2006).

List of current and proposed goals for Subdistricts 5 and 6 Chinook stocks.

Stream	Current Goal		Proposed Goal
Shaktoolik River Aerial	400–800	SEG	No Change
Unalakleet/Old Woman River Aerial	550–1,100	SEG	No Change
North River Tower	1,200–2,600	SEG	No Change

[2] Fair, L., C. Lean, F. DeCicco, J. Magdanz, and R. McLean. Unpublished. Proposed salmon BEGs for Norton Sound and Kotzebue Sound. Alaska Department of Fish and Game, Division of Commercial Fisheries, 1999 Memorandum, Anchorage.

MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCKS OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY

NORTON SOUND SUBDISTRICTS 5 AND 6 CHINOOK SALMON MANAGEMENT PLAN REVIEW/DEVELOPMENT

Current Stock Status

In response to the guidelines established in the *Policy for Management of Sustainable Salmon Fisheries* (5 AAC 39.222), the department recommended continuing the designation of the Subdistricts 5 and 6 Chinook salmon stock as a yield concern at the October 2006 BOF work session. The Alaska Board of Fisheries, after reviewing stock status information and public input during the January 31–February 5, 2007 regulatory meeting, is anticipated to continue the classification of Subdistricts 5 and 6 Chinook salmon stock as a yield concern. This determination is anticipated to be based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs during the last 5 years (2002–2006).

Customary and Traditional Use Finding and Amount Necessary for Subsistence Uses

The BOF has made a positive finding for customary and traditional use for salmon in the Norton Sound-Port Clarence Area. Amounts reasonably necessary for subsistence (ANS) uses has been determined to be 96,000–160,000 salmon for the Norton Sound-Port Clarence Area. Subsistence fishing restrictions targeting the Chinook salmon stocks have occurred 3 times (2003, 2004, and 2006) in the last 5 years in Subdistricts 5 and 6.

HABITAT FACTORS ADVERSELY AFFECTING THE STOCK

Annual spring flooding causes ice to scour many river sections within the Shaktoolik and Unalakleet Rivers. There has been fish habitat damage in the Unalakleet drainage due to road construction. An access road has blocked complete estuarine exchange within the lower Unalakleet River estuary; although fish passage is maintained through other channels. Historically, this area has not been mined as in northern Norton Sound and in particular the Nome area. The upper Unalakleet River is designated as a Wild and Scenic River and the habitat remains pristine.

DO NEW OR EXPANDING FISHERIES ON THIS STOCK EXIST?

There are no new or expanding fisheries on this stock. However, Norton Sound bound Chinook salmon are likely caught as bycatch in the Bering Sea groundfish fishery. The Chinook salmon bycatch greatly increased from 2003 through 2006, though it is unknown what portion of this bycatch are Norton Sound Chinook salmon stocks.

EXISTING MANAGEMENT PLAN

5 AAC 01.160 FISHING SEASONS AND PERIODS. (b) In the Norton Sound District, fish may be taken at any time except as follows:

> (3) in the Unalakleet River from June 1 through July 15, salmon may be taken only from 8:00 a.m. Monday until 8:00 p.m. Saturday.

5 AAC 01.170 LAWFUL GEAR AND GEAR SPECIFICATIONS. (g) In the Unalakleet River from June 1–July 15, no person may operate more than 25 fathoms of gillnet in the aggregate and no person may operate an unanchored fishing net.

ACTION PLAN DEVELOPMENT

NORTON SOUND SUBDISTRICTS 5 AND 6 CHINOOK SALMON ACTION PLAN GOAL

The goal of the Norton Sound Subdistricts 5 and 6 Chinook Salmon Action plan is to reduce fishing mortality in order to meet spawning escapement goals, to provide reasonable opportunity for subsistence fishing, and to re-establish historical range of harvest levels by other users.

Regulation Changes Adopted in January 2004

In January 2004, after review of the management action plan options addressing this stock of concern (Jones 2003), the BOF adopted subsistence fishing regulations 5 AAC 01.170(j)(1) and sport fishing regulations 5 ACC 70.008(c)(9). Regulation 5 AAC 01.170(j)(1) states that during times in which the commissioner determines it is necessary for the conservation of king salmon, the commissioner may, by emergency order, close the subsistence fishing season in Subdistricts 5 and 6 and immediately reopen the season in those subdistricts during which gillnets must have a mesh size not exceeding 6 inches in width. Regulation 5 ACC 70.008(c)(9) increased the sport fish daily bag and possession limit from 1 to 2 Chinook salmon. However, the daily bag limit can only be comprised of one fish exceeding 20 inches in length. In addition, this regulation places an annual sport limit of 4 Chinook salmon 20 inches or greater in the Unalakleet River drainage, of which only two can be taken from the North River. Regulation 5 ACC 70.008(c)(9) also stipulates that anglers targeting Chinook salmon in the Unalakleet River drainage must possess and complete a current year's harvest record as described in 5 AAC 70.024.

Management Review

Commercial and Subsistence Fisheries

The strategy used by the department to open the commercial Chinook salmon fishery in Subdistricts 5 and 6 is to wait until increasing test net and subsistence catches have been observed for at least 7 days in the Unalakleet River. Typically, Chinook salmon commercial fishing consists of twice weekly 24 hour periods. This strategy is followed to prevent fishing on milling Chinook salmon, migrating Yukon River stocks and to allow for adequate escapement. The only subsistence fishing schedule is for the Unalakleet River which is closed for 36 hours per week from June 1 to July 15. Similar restrictions have not been implemented in the Shaktoolik River due to relatively low fishing pressure as Shaktoolik is a much smaller village than Unalakleet. The Shaktoolik River is open 7 days per week to subsistence fishing. However, the majority of the fishing effort in the Shaktoolik Subdistrict occurs in the marine waters during Chinook salmon season, with only one or two nets fishing in the Shaktoolik River. Aerial surveys are attempted on the Shaktoolik River when conditions are favorable.

From 2002–2004 as well as in 2006, there were no commercial Chinook salmon fisheries because of weak runs. The Unalakleet River test gillnet fishery and North River tower projects provide inseason information on relative run size and run timing (Table 6; Figure 12). There were two 24-hour directed commercial Chinook salmon openings in 2005, but the fishery was closed after poor commercial catches, and after test net catches and the North River tower counts

abruptly decreased. Subsistence fishing for Chinook salmon was closed for 3 weeks in both the Shaktoolik and Unalakleet River drainages in 2003, for 2 weeks in July of 2004 in the Unalakleet River drainage, and for 12 days in July of 2006 in the Shaktoolik and Unalakleet River drainages (Table 3).

Sport Fisheries

Sport fishery management actions are usually not taken inseason unless it appears that escapement goals will not be met and an action to reduce subsistence harvest is contemplated. Three emergency orders to reduce or close the sport fish harvest of Chinook have been written in the last 4 years. In 2003, the Unalakleet and Shaktoolik rivers were closed to the retention of Chinook salmon from July 3 through August 15 and the use of bait was prohibited. In 2004, sport fishing was allowed in the Unalakleet River, but all Chinook salmon had to be immediately released effective July 9 through August 3 and the use of bait was prohibited. In 2006, the marine and fresh waters of Subdistricts 5 and 6 were closed to Chinook salmon fishing from July 8 through August 15 and the use of bait was prohibited during this period.

ACTION PLAN ALTERNATIVES

Draft Management Plan

In 2004, the BOF tasked ADF&G to develop a management plan for Chinook salmon in the Unalakleet River drainage in order to achieve escapement goals, provide for subsistence fishing priority, and allow for other uses when there is a surplus. During 2006 subsistence surveys conducted postseason, ADF&G asked fishers which restrictions and/or guidelines they thought would work best in terms of both meeting future harvest needs and reaching escapement goals in the Unalakleet River drainage. ADF&G staff attempted to survey every household in Unalakleet and a total of 176 households were surveyed. The results of that survey are presented in Table 7.

The following is a draft Norton Sound Subdistricts 5 and 6 Chinook Salmon Management Plan.

5 AAC 04.39X. Subdistricts 5 and 6 of Norton Sound District King Salmon Management Plan.

(a) The objective of this plan is to provide the department with guidelines to manage for the sustained yield of Subdistricts 5 and 6 king salmon. The department shall use the best available data, including preseason run projections, test fishing indices, age and sex compositions, subsistence and commercial harvest reports and passage estimates from escapement monitoring projects to assess the run size for the purpose of implementing this plan.

(b) The department shall manage commercial fishing as follows:

(1) the commissioner may open a directed commercial king salmon fishery if inseason indicators of run strength show the run is large enough to provide for a harvestable surplus and a reasonable opportunity for subsistence uses and for nonsubsistence fisheries, the subsistence fishing shall revert to the fishing periods in 5 AAC 01.160;

(2) no more than two 24-hour king salmon directed periods per week.

(c) The department shall manage subsistence fishing as follows:

(1) between June 15 and June 20 the department will established a subsistence fishing schedule in Subdistrict 5 and Subdistrict 6 marine waters where salmon may only be taken during two 48-hour periods per week from 6 p.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday and this schedule will continue through July 15.

(2) between June 15 and June 20 the department will establish a subsistence fishing schedule in the Unalakleet River where salmon may only be taken during two 36-hour periods per week from 8 a.m. Monday until 8 p.m. Tuesday and from 8 a.m. Thursday until 8 p.m. Friday and this schedule will continue through July 15.

(3) if after June 30 spawning escapement goals are not expected to be met, the department will consider:

a. restricting subsistence fishing in Subdistrict 5 and 6 marine waters to 6 inch or less gillnet mesh size.
b. restricting subsistence gillnet fishing in the Unalakleet River drainage to 6 inch or less gillnet mesh size.
c. closing the Unalakleet River drainage to subsistence fishing except for 4.5 inches or less gillnet mesh size
d. closing subsistence king salmon fishing in both the Subdistrict 5 and 6 marine waters and Unalakleet River.

(4) On July 15 the department will return to the 7 day a week subsistence fishing schedule in Subdistrict 5 and 6 marine waters and in the Unalakleet River.

(d) The sport fishery in the Unalakleet River drainage will be managed to coordinate with subsistence fisheries and take restrictions when subsistence restrictions are taken as follows:

(1) if subsistence fishing time in the Unalakleet River drainage is restricted less than the two regular 36 hour subsistence openings then the sport fish harvest annual limit will be reduced to 2 fish.

(2) if Subdistrict 5 and 6 marine water fishing is reduced to less than the two regular 48 hour subsistence openings then the sport fishery daily bag will be reduced to one king salmon.

(3) if subsistence fishing is closed to king salmon in the Unalakleet River drainage then all sport fishing for king salmon will be catch and release only and no bait, i.e. closed to the retention of king salmon.

(4) if in addition, the Subdistrict 5 and 6 marine waters are closed to subsistence fishing, the sport fishery for king salmon will be closed.

(5) if necessary, based on preseason run projections, test fishing indices, age and sex compositions, subsistence and commercial harvest reports and passage estimates from escapement monitoring projects to assess the run size, restrictions to the sport fishery may occur prior to the initiation of the actions in 1–4 above, if the Department deems it necessary to meet escapement.

Action 1

The department would issue permits to subsistence fishers and set limits on the number of Chinook salmon that can be legally harvested by each permit holder.

Objective

The objective of this action is to limit the harvest of Chinook salmon, thereby reducing mortality and permitting more fish to reach the spawning grounds.

Specific Action Recommended to Implement the Objective

Allow area managers to issue subsistence permits with prescribed harvest on Chinook salmon in the Unalakleet Subdistrict. Prescribed harvest limits would be set according to the strength of the forecasted run, but could then be reduced or increased inseason by emergency order depending on the magnitude of the Chinook salmon return.

Subsistence Issues/Considerations

There are currently no subsistence harvest limits. Thus far, restrictions placed on gear, fishing periods and fishing area have not succeeded in terms of both maintaining subsistence harvest levels and meeting escapement needs. Permits with prescribed bag limits allow area managers another tool for managing the Unalakleet River Chinook salmon stock before the run begins. Harvest limits could be set based on the Chinook salmon run forecast and then adjusted inseason according to actual run strength as escapements are monitored via the Unalakleet River test net, North River tower and aerial surveys. Fishers would be required to have their permit in possession when fishing and would fill out a harvest record and calendar. Placing limits on Chinook salmon subsistence harvests may cause other salmon species such as coho to incur more fishing pressure than in the past. It is likely that such a resource shift would not be an issue if coho returns continue to be as strong as they have in recent history, but there could be implications during years with weak coho runs. Some of the survey comments by Unalakleet residents suggested that subsistence fishers would temporarily shift their dependency to coho in order to conserve Chinook salmon. However, fishers strongly rejected being required to have subsistence permits by a margin of 4 to 1 (Table 7).

Cost/Benefit Analysis

The cost of this action may be a big reduction in harvests for households that rely more heavily on Chinook salmon for their subsistence needs, and other species such as coho could experience an increase in fishing pressure as an indirect consequence of this action. The benefit is that this action gives area managers an additional method for regulating the harvest of Chinook salmon and prescribed bag limits can be adjusted in proportion to run strength.

Performance Measures

Projects are set in place to monitor escapement inseason.

2007 BOARD OF FISHERIES REGULATORY PROPOSALS AFFECTING NORTON SOUND SUBDISTRICTS 5 AND 6 CHINOOK SALMON

NORTON SOUND - SUBSISTENCE AND SPORT

148 – Allow cash exchange of subsistence caught fish.

NORTON SOUND - COMMERCIAL

149 – Clarify Norton Sound salmon fishing periods.

Proposal 148 would allow limited sales of subsistence caught fish and proposal 149 clarifies commercial fishing periods are established by emergency order rather than weekly fishing schedules.

RESEARCH PLAN

NORTON SOUND INITIATIVE AND AYK SUSTAINABLE SALMON INITIATIVE

A Norton Sound Research and Restoration Initiative (NSI) committee was formed and identified and prioritized research needs in response to the low chum salmon run in 1999. Through this initiative, native organizations, private industry, non-profit organizations, state and federal agencies have joined together to form an innovation partnership to cooperatively address salmon research and restoration needs. The NSI projects have been operational since 2001 and completed field work in 2006 and a final report is scheduled to be issued in 2007. No NSI project was established in Subdistricts 5 and 6. However, a survey for possible weir sites on Norton Sound rivers was completed in 2001 and included possible sites on the North and Unalakleet rivers (Menard 2001). The Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (AYK SSI) was formed after the NSI and is similar in organization, but encompasses the Yukon and Kuskokwim areas in addition to Norton Sound. The AYK SSI has developed an AYK Salmon Research and Restoration Plan designed to identify significant knowledge gaps and establish research priorities that complement other relevant research programs in the region. The AYK SSI is in the process of determining project funding for the 2007 field season.

RESEARCH PROJECTS

The department has submitted a proposal to radio tag Chinook salmon to investigate their spawning distribution in the Unalakleet River drainage. Previously there was a radiotelemetry project to document Chinook salmon distribution and data suggested that the North River accounts for approximately 40% of the Chinook salmon that return annually to the Unalakleet River drainage to spawn (Wuttig 1999). Data obtained from the 2007 telemetry study will allow the department to determine if that proportion has changed and hence re-evaluate the importance of the North River counting tower as an escapement index for Unalakleet River Chinook salmon. Additionally, in association with this radiotelemetry project, the age, sex, size composition of Chinook salmon escapement to the Unalakleet River will be documented. The age, sex, size composition of the subsistence harvest will also be documented.

Funding has been requested to begin genetic stock identification work on Chinook salmon stocks in Norton Sound, and in particular the Unalakleet and Shaktoolik River stocks. The associated funding proposal seeks funds to collect baseline samples for harvest stock discrimination

possibilities. We also plan on collecting tissue samples from the marine waters harvest within Subdistricts 5 and 6 to determine stock of origin of that harvest in the future.

Norton Sound Economic Development Corporation (NSEDC) has provided funds to purchase a DIDSON sonar unit for the Shaktoolik River for a feasibility study to count Chinook salmon escapement in that river drainage. Starting in 2008, the department will begin formulation of Chinook salmon escapement goals in terms of older-aged (age-3 ocean and older salmon) Chinook salmon.

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TABLES AND FIGURES

Table 1.–Subdistricts 5 and 6 commercial and subsistence Chinook salmon harvest, Norton Sound District, 1961–2006.

	Shaktoolik (5)		Unalakleet (6)		Combined Totals	
Year	Commercial	Subsistence	Commercial	Subsistence	Commercial	Subsistence
1961	140		5,160		5,300	
1962	1,738		5,089		6,827	
1963	480		5,941		6,421	
1964[a]	631	77	1,273	488	1,904	565
1965[a]	127	31	1,321	521	1,448	552
1966[a]	310	142	1,208	90	1,518	232
1967[a]	43	262	1,751	490	1,794	752
1968[a]	61	10	960	186	1,021	196
1969[a]	33	40	2,276	324	2,309	364
1970[a]	197	43	1,604	495	1,801	538
1971[a]	284	87	2,166	911	2,450	998
1972[a]	419	64	2,235	643	2,654	707
1973[a]	289	51	1,397	323	1,686	374
1974[a]	583	93	2,100	313	2,683	406
1975[a]	651	18	1,638	163	2,289	181
1976[a]	892	24	1,211	142	2,103	166
1977[a]	1,521	49	2,691	723	4,212	772
1978[a]	1,339	81	7,525	1,044	8,864	1,125
1979[a]	2,377	62	6,354	640	8,731	702
1980[a]	1,086	57	4,339	1,046	5,425	1,103
1981[a]	1,484	8	6,157	869	7,641	877
1982[a]	1,677	68	3,768	913	5,445	981
1983[a]	2,742		7,022	1,868	9,764	1,868
1984[a]	1,613		6,804	1,650	8,417	1,650
1985[a]	5,312	298	12,621	1,397	17,933	1,695
1986	1,075		4,494	1,339	5,569	
1987	2,214		3,246		5,460	
1988	671		2,218		2,889	
1989	1,241		4,402		5,643	
1990[a]	2,644		5,998	2,476	8,642	2,476
1991	1,324		4,534		5,858	
1992	1,098		3,409		4,507	
1993	2,756		5,944		8,700	
1994[b]	885	1,175	4,400	3,000	5,285	4,175
1995[b]	1,239	1,275	7,617	3,026	8,856	4,301
1996[b]	1,340	1,114	3,644	2,894	4,984	4,008
1997[b]	2,449	1,146	9,067	4,191	11,516	5,337
1998[b]	910	982	6,413	3,963	7,323	4,945
1999[b]	581	818	1,927	2,691	2,508	3,509
2000[b]	160	440	582	2,429	742	2,869
2001[b]	90	936	116	2,810	206	3,746
2002[b]	1	1,230	4	2,367	5	3,597
2003[b]	2	806	10	2,585	12	3,391
2004[b]	0	943	0	2,801	0	3,744
2005[b]	50	807	101	2,115	151	2,922
2006[b]	0	382	12	2,157	12	2,539
5-year Avg. (2002–2006)	11	834	25	2,405	36	3,239
5-year Avg. (1994–1998)	1,365	1,138	6,228	3,415	7,593	4,553
10-year Avg. (1989–1998)	1,589	1,138	5,543	3,258	7,131	4,207
	0.9922	0.27	1.00	0.30	1.00	0.29

[a] Subsistence harvests based on household surveys. The number of households surveyed is unknown and varied annually. Actual harvests were greater.

[b] Subsistence harvests based on expanded household survey estimates for Shaktoolik and Unalakleet. Harvest numbers do not include other residents outside of Subdistricts 5 and 6 that fished.

Table 2.–Unalakleet River Chinook salmon sport fish effort, harvest, and catch estimates for 1983–2005.

Year	Number of Anglers	Number of Trips	Number of Angler Days	Chinook Salmon Catch	Chinook Salmon Harvest
1983	[a]	[a]	[a]	[a]	93
1984	[a]	[a]	[a]	[a]	39
1985	[a]	[a]	[a]	[a]	179
1986	[a]	[a]	[a]	[a]	850
1989	[a]	[a]	[a]	[a]	49
1990	482	1,642	3,974	361	276
1991	917	3,236	5,616	375	296
1992	685	2,256	2,433	476	117
1993	625	1,398	2,153	2,340	382
1994	777	2,192	2,349	517	379
1995	1,009	3,376	3,832	588	259
1996	695	1,886	2,539	2,059	384
1997	941	3,366	4,393	5,144	842
1998	835	3,197	3,795	1,539	513
1999	995	1,726	4,176	669	415
2000	1,002	3,415	6,257	1,045	345
2001	918	1,365	2,793	542	250
2002	1,093	4,314	8,195	835	544
2003	509	1,643	3,056	505	97
2004	741	2,015	4,527	1,930	356
2005	747	3,257	4,768	431	216
2006	[b]	[b]	[b]	[b]	[b]
5-year avg (2001–2005)	802	2,519	4,668	849	293
10-year avg (1990–1999)	796	2,428	3,526	1,407	386

[a] Sport fish harvest data unavailable prior to 1983 and from 1987–1988.

[b] 2006 sport fish harvest data unavailable.

Table 3.–Subdistricts 5 and 6 management actions.

1993	-Commercial drift fishing allowed in June so fishers can avoid fouling their nets with the debris loads in the spring. Chum fishing closed early because of weak run.
1994	-Chinook salmon periods limited to two 24-hour periods per week. Pink salmon fishing opened continuously. There was no fisher interest in chum salmon. A strong coho salmon run results in record harvest.
1995	-Strong Chinook salmon run. Buyer expresses interest in pink salmon and limited interest in chum salmon. Late season coho salmon closure (August 26) to bolster escapement.
1996	-Early run of Chinook salmon. Limited market for chum salmon. Pink salmon fishing opened continuously. Strong run of coho salmon.
1997	-The last year the majority of the Chinook periods are two 48-hour periods per week. Best Chinook commercial harvest of the decade. Limited market for chum salmon. Coho run is below average and season closes on August 23.
1998	-The majority of Chinook periods are now 24 hours in length. Limited market for chum salmon. Pink salmon fishing opened continuously because of large surplus of pink salmon. Shaktoolik Subdistrict opened to continuous fishing the last 2 weeks of August to provide flexibility during persistent inclement weather.
1999	-Weak runs of Chinook, chum and coho salmon. Coho commercial fishing restricted to two 24-hour periods per week instead of the normal two 48-hour periods per week.
2000	-Only two commercial Chinook fishing periods. Lowest commercial Chinook and chum harvest to date. Pink salmon fishing opened continuously to allow buyer to more effectively direct fleet. Pink catches were below average which was attributed to low volumes of fish and lack of fishing interest.
2001	-Only two commercial Chinook fishing periods. Lowest commercial Chinook and chum harvest to date.
2002	-No commercial Chinook or chum fishing because of weak runs. No market interest in pink salmon unless there is a 500,000 pink salmon harvest projection. -Coho commercial fishing time reduced to two 24 hour periods per week. Commercial coho fishing closed on August 19 to protect coho salmon. Sport fish reduces bag limit to one per day from five per day.
2003	-No commercial Chinook or chum fishing because of weak runs. -Three week (July 3-25) subsistence salmon fishing closure to protect Chinook and chum in Shaktoolik and Unalakleet River drainages. Subsistence beach seining for pink salmon is allowed. -Unalakleet and Shaktoolik rivers sport fishing closed to the retention of Chinook salmon from July 3 through August 15 and the use of bait was prohibited during this period.
2004	-No commercial Chinook salmon fishing periods. -Unalakleet River drainage closed to salmon gillnet fishing effective July 10. Beach seining is permitted to target large numbers of pink salmon but closed to the retention of Chinook salmon. -Commercial coho fishing opened on July 26 to the regular schedule of two 48-hour periods per week for the remainder of the season. The season closed on September 7 by regulation.

-continued-

-Sport fishing was allowed in the Unalakleet River, but all Chinook salmon had to be immediately released effective July 1 through August 3 and the use of bait was prohibited during this period.

2005 -Two 24-hour Chinook salmon commercial fishing periods were allowed beginning June 27 and ending June 30. However, Chinook commercial catches were poor and test net catches and tower counts also dropped off abruptly in early July. As a result, commercial fishing was not permitted until coho salmon season.

-The coho salmon commercial fishing season was opened on July 24 as a result of record test net catches of coho during the third week of July. The regular schedule of two 48-hour periods per week was in effect for the remainder of the season. The season closed by regulation on September 7.

2006 -No commercial Chinook salmon fishing periods.

-Unalakleet River Test Net catches and North River tower counts of Chinook salmon were well below average. As a result, the fresh and marine waters of Subdistricts 5 & 6 were closed to salmon gillnet fishing effective July 10. Beach seining was allowed, but Chinook salmon had to be immediately released.

-Coho salmon commercial fishing opened on July 21. Coho catches were well above average to record setting throughout the season.

-Commercial coho fishing extended after the regulatory closure date because of record commercial and test net catches for the first week of September. The commercial salmon fishing season closed on September 14.

-Marine and fresh waters of Subdistricts 5 and 6 were closed to sport fishing for Chinook salmon from July 8 through August 15 and the use of bait was prohibited during this period.

Table 4.–Estimated escapement, total harvest, and total run, Unalakleet River Chinook salmon, 1984–1986 and 1996–2006.

Year	North River Tower Operating Period	Escapement [a]		Total		
		North River	Unalakleet River	Harvest	Run	Exploitation Rate (%)
1984	June 25–July 28	2,844	7,368	8,493	15,861	53.5
1985	June 27–Aug 31	1,426	3,694	14,197	17,891	79.4
1986 [b]	June 25–July 18	1,613	4,179	6,683	10,862	61.5
[c]	[c]					
1996	June 16–July 25	1,197	3,101	6,922	10,023	69.1
1997	June 16–Aug 21	4,185	10,842	14,100	24,942	56.5
1998	June 15–Aug 12	2,100	5,440	10,889	16,329	66.7
1999	June 30–Aug 31[d]	2,648	6,860	5,033	11,893	42.3
2000	June 17–Aug 12	1,046	2,710	3,356	6,066	55.3
2001	July 05–Sept 15[d]	1,791	4,640	3,176	7,816	40.6
2002	June 19–Aug 29	1,505	3,899	2,915	6,814	42.8
2003	June 15–Sept 13	1,452	3,762	2,692	6,454	41.7
2004	June 15–Sept 14	1,125	2,915	3,157	6,072	52.0
2005	June 15–Sept 15	1,015	2,630	2,432	5,062	48.0
2006 [e]	June 18–Sept 15	906	2,347	2,462	4,809	51.2

[a] Drainage-wide escapement estimate calculated by expanding tower counts by 0.386, the average proportion of Chinook salmon migrating into the North River, 1997 and 1998 (Wuttig, 1999).

[b] 1986 Subsistence harvest data unavailable. The average subsistence harvest from 1981–1985 substituted.

[c] North River tower not operational from 1987–1995.

[d] Projected started late. Tower counts were expanded based on average run timing (Estensen and Evenson 2006).

[e] Sport fish harvest unavailable. The average sport fish harvest from 2001–2005 was substituted.

Table 5.–Unalakleet River drainage Chinook salmon percent exploitation by fishery, 1984–1986 and 1996–2006.

	Exploitation Rate (%)			
Year	**Commercial**	**Subsistence**	**Sport Fish**	**Total**
1984	42.9	10.4	0.2	53.5
1985	70.5	7.8	1.0	79.4
1986 [a]	41.4	12.3	7.8	61.5
1996	36.4	28.9	3.8	69.1
1997	36.4	16.8	3.4	56.5
1998	39.3	24.3	3.1	66.7
1999 [b]	16.2	22.6	3.5	42.3
2000	9.6	40.0	5.7	55.3
2001 [b]	1.5	36.0	3.2	40.6
2002	0.1	34.7	8.0	42.8
2003	0.2	40.1	1.5	41.7
2004	0.0	46.1	5.9	52.0
2005	2.0	41.8	4.3	48.0
2006 [c]	0.2	44.9	6.1	51.2
Avg 1997–2001	20.6	27.9	3.8	52.3
Avg 2002–2006	0.5	41.5		45.0
Avg 1997–2006	10.5	34.7		49.7

[a] Subsistence harvest data unavailable for 1986. The average subsistence harvest from 1981–1985 substituted.

[b] Based on expanded tower counts to compensate for late project start up (Estensen and Evenson 2006).

[c] 2006 Sport fish harvest data unavailable. The average harvest from 2001–2005 substituted.

Table 6.–Unalakleet River test net and North River tower Chinook salmon run timing cumulative percentage by date, Unalakleet Subdistrict, Norton Sound, 2004–2006.

	2004		2005		2006		Historical Average[a]	
Date	Unalakleet River Test Net	North River Tower	Unalakleet River Test Net	North River Tower	Unalakleet River Test Net	North River Tower	Unalakleet River Test Net	North River Tower
5-Jun	0.0		0.0		0.0		0.4	
6-Jun	0.0		0.0		0.0		0.5	
7-Jun	0.0		0.0		0.0		0.7	
8-Jun	0.0		0.0		0.0		1.2	
9-Jun	3.4		0.0		0.0		1.9	
10-Jun	17.2		0.0		0.0		3.9	
11-Jun	17.2		0.0		0.0		4.9	
12-Jun	20.7		1.3		0.0		6.7	
13-Jun	27.6		1.3		0.0		7.8	
14-Jun	31.0		1.3		0.0		9.4	
15-Jun	31.0		1.3		1.3		11.1	0.0
16-Jun	31.0		1.3		1.3		12.8	0.1
17-Jun	31.0		1.3		3.8		15.5	0.1
18-Jun	31.0	0.0	12.8	0.0	3.8	0.0	18.6	0.2
19-Jun	31.0	0.0	24.4	0.0	6.3	0.0	21.7	0.3
20-Jun	37.9	0.4	30.8	0.0	11.4	0.0	27.3	0.6
21-Jun	37.9	0.4	37.2	0.0	15.2	0.0	30.7	0.7
22-Jun	37.9	0.4	41.0	0.2	16.5	0.2	34.6	0.8
23-Jun	41.4	0.7	51.3	-0.4	20.3	0.2	37.4	1.3
24-Jun	41.4	0.9	59.0	0.0	22.8	0.3	40.6	1.7
25-Jun	44.8	1.4	67.9	4.5	22.8	1.2	44.3	2.9
26-Jun	44.8	5.0	73.1	4.9	27.8	2.1	47.5	4.0
27-Jun	44.8	10.7	76.9	5.7	31.6	4.7	51.2	5.7
28-Jun	44.8	17.4	78.2	12.2	35.4	5.2	53.9	8.7
29-Jun	44.8	24.7	78.2	21.1	39.2	5.2	56.1	12.5
30-Jun	44.8	26.0	80.8	28.2	51.9	6.0	58.0	16.5
7/01	51.7	25.4	82.1	30.5	54.4	15.1	60.7	21.0
7/02	55.2	28.1	84.6	32.7	55.7	25.7	64.0	24.9
7/03	58.6	28.4	85.9	35.7	55.7	28.6	66.6	29.4
7/04	62.1	31.1	85.9	47.3	55.7	31.0	68.9	33.6
7/05	62.1	32.0	89.7	48.1	55.7	34.1	71.4	37.2
7/06	65.5	40.5	93.6	56.2	55.7	40.1	75.1	42.1
7/07	69.0	48.2	93.6	60.1	55.7	44.3	78.6	46.6
7/08	72.4	50.0	94.9	61.9	57.0	48.1	81.2	49.9
7/09	72.4	52.8	96.2	63.9	57.0	50.3	82.7	55.0
10-Jul	72.4	55.6	97.4	67.7	57.0	53.6	85.6	58.2
11-Jul	75.9	69.2	100.0	72.8	57.0	60.9	87.5	64.2
12-Jul	75.9	74.4	100.0	73.6	58.2	94.9	88.2	67.9
13-Jul	79.3	79.7	100.0	74.8	73.4	66.9	90.5	71.4
14-Jul	79.3	86.7	100.0	79.3	81.0	70.6	91.8	74.6
15-Jul	79.3	90.4	100.0	84.4	84.8	75.6	93.2	78.5
16-Jul	82.8	91.3	100.0	87.9	92.4	81.3	94.8	81.3
17-Jul	86.2	91.9	100.0	88.7	93.7	82.8	95.8	83.8
18-Jul	86.2	92.6	100.0	89.9	97.5	83.9	96.4	86.0
19-Jul	89.7	94.0	100.0	90.0	98.7	85.9	97.0	88.2
20-Jul	89.7	96.2	100.0	90.8	98.7	87.2	98.7	90.5
21-Jul	89.7	97.2	100.0	92.8	98.7	88.5	98.8	92.6
22-Jul	93.1	97.8	100.0	94.4	98.7	89.6	99.4	94.3
23-Jul	93.1	98.0	100.0	95.2	98.7	90.5	99.5	95.5
24-Jul	96.6	98.1	100.0	96.4	98.7	91.2	99.7	96.3
25-Jul	100.0	98.3	100.0	96.6	98.7	91.8	99.9	97.1

[a] The Unalakleet River test net historical average is from 1986-2006 and the North River tower average includes the years 1996–1998, 2000, 2002–2006.

Table 7.–Results from the survey investigating possible Chinook salmon management plan options in the village of Unalakleet, 2006.

In 2004, the Board of Fisheries tasked the Department of Fish & Game to develop a management plan for Chinook salmon in the Unalakleet River drainage. Since then, restrictions on commercial, sport fishing, and subsistence fishing have failed to meet harvest and escapement needs for Chinook salmon. As a result, a new management plan will be in effect for the 2007 season. We asked you which restrictions and/or guidelines you thought would work best in terms of both meeting future harvest needs and reaching escapement goals in the Unalakleet River drainage. ADF&G staff attempted to survey every household in Unalakleet and a total of 176 households were surveyed. The results of that survey are presented below.

1.) "Status quo" management plan (subsistence ocean fishing open 7 days a week, subsistence in-river fishing closed Saturday 8 p.m. until Monday 8 a.m.) remains in effect with the likelihood of earlier closure if escapements are poor.

74%	Yes	26%	No

2.) The department would restrict subsistence fishing for Chinook salmon to two 48-hour fishing periods per week in the river.

28%	Yes	72%	No

3.) The department would restrict subsistence fishing for Chinook salmon to two 48-hour periods per week in both the ocean and the river.

24%	Yes	76%	No

4.) The department would use point goals at the North River tower as guidelines to implement restrictions and/or closures on Chinook salmon fishing. That is a certain number of Chinook salmon must be counted by certain dates in order for restrictions or closures to be avoided.

50%	Yes	50%	No

4.) The department would issue subsistence permits to fishers and set limits on the number of Chinook that can be legally harvested by each permit holder.

19%	Yes	81%	No

6.) The 2007 season would begin by being closed to Chinook salmon and opened if test net catches, tower counts, and aerial surveys indicate escapement goals will likely be made.

23%	Yes	77%	No

7.) The department would automatically close Chinook salmon fishing on June 30th if it is unlikely escapement will be met.

65%	Yes	35%	No

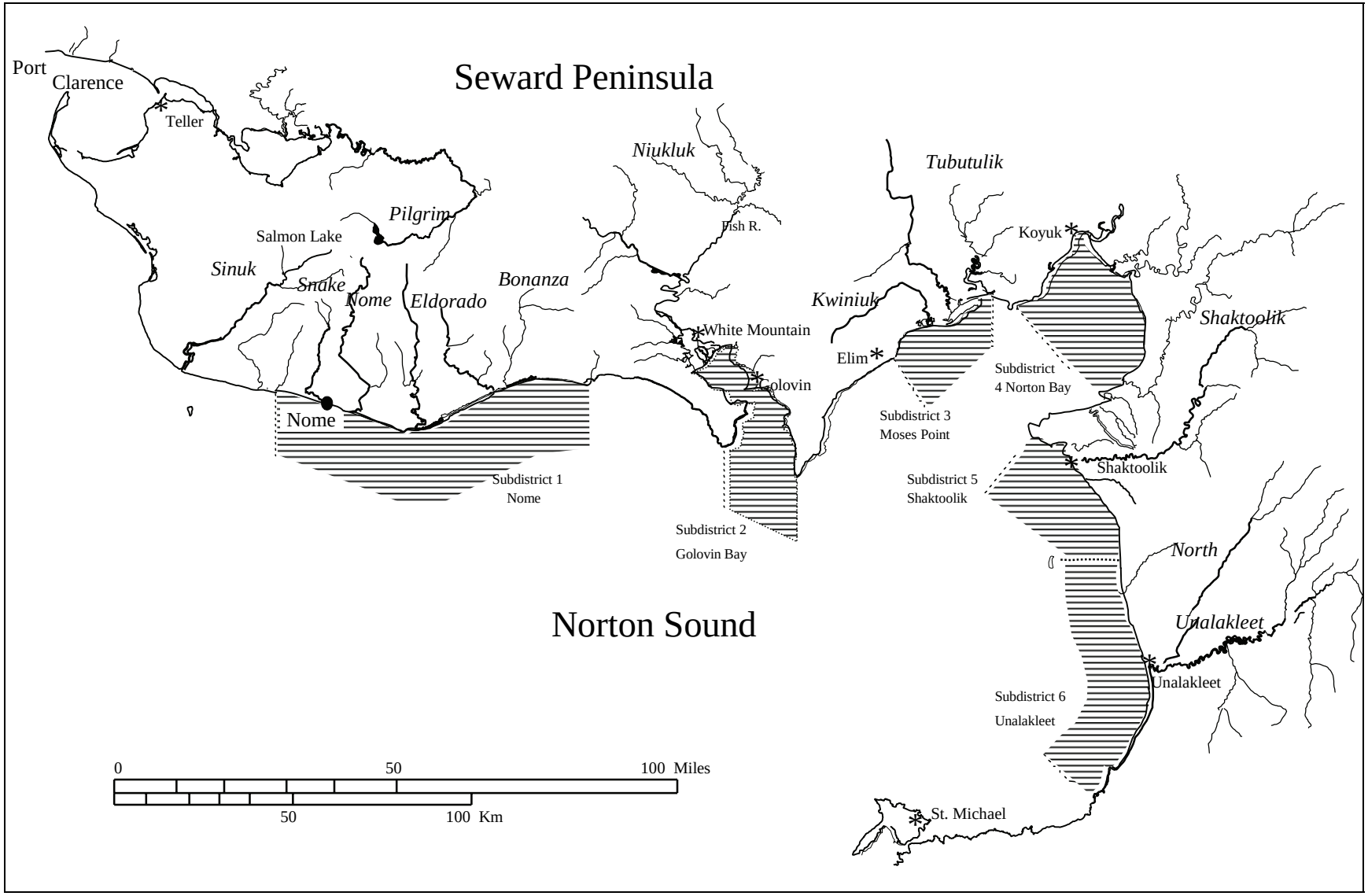


Figure 1.–Salmon commercial fishing subdistricts and rivers in Norton Sound.

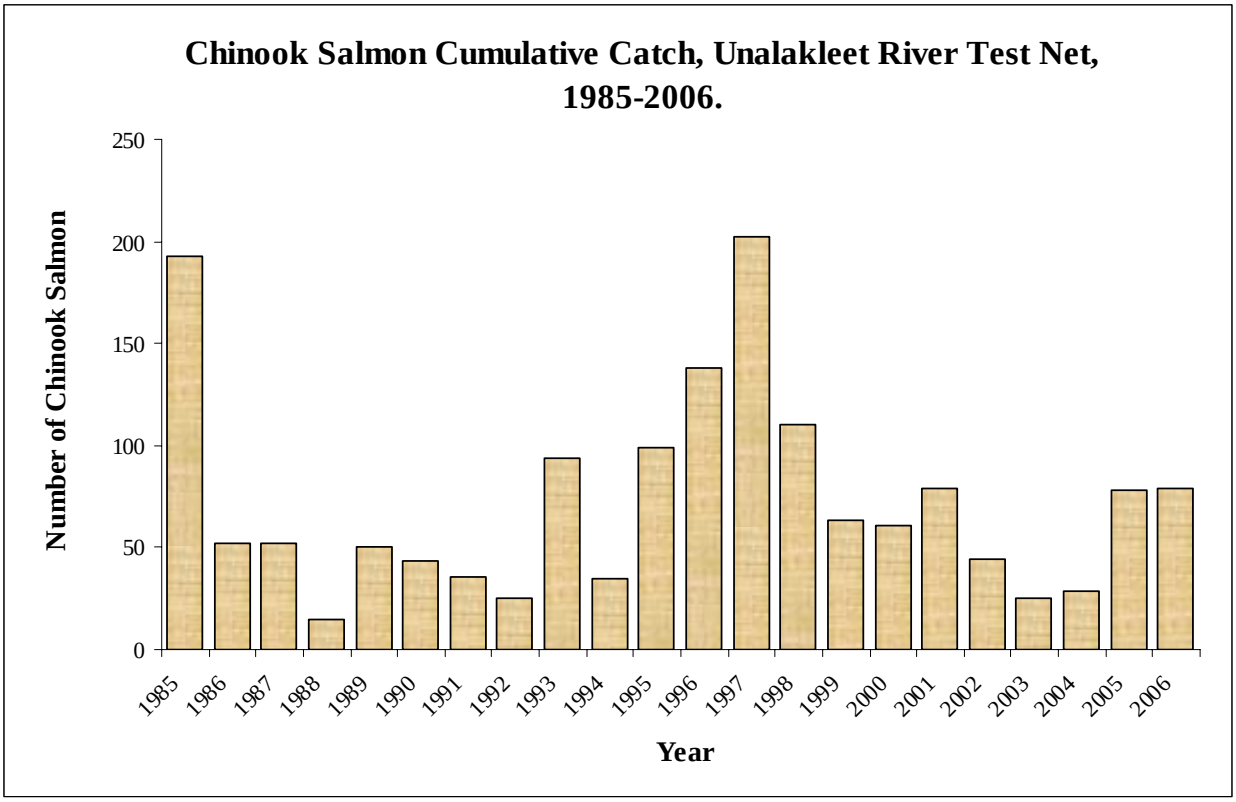


Figure 2.–Unalakleet River test net Chinook salmon catch.

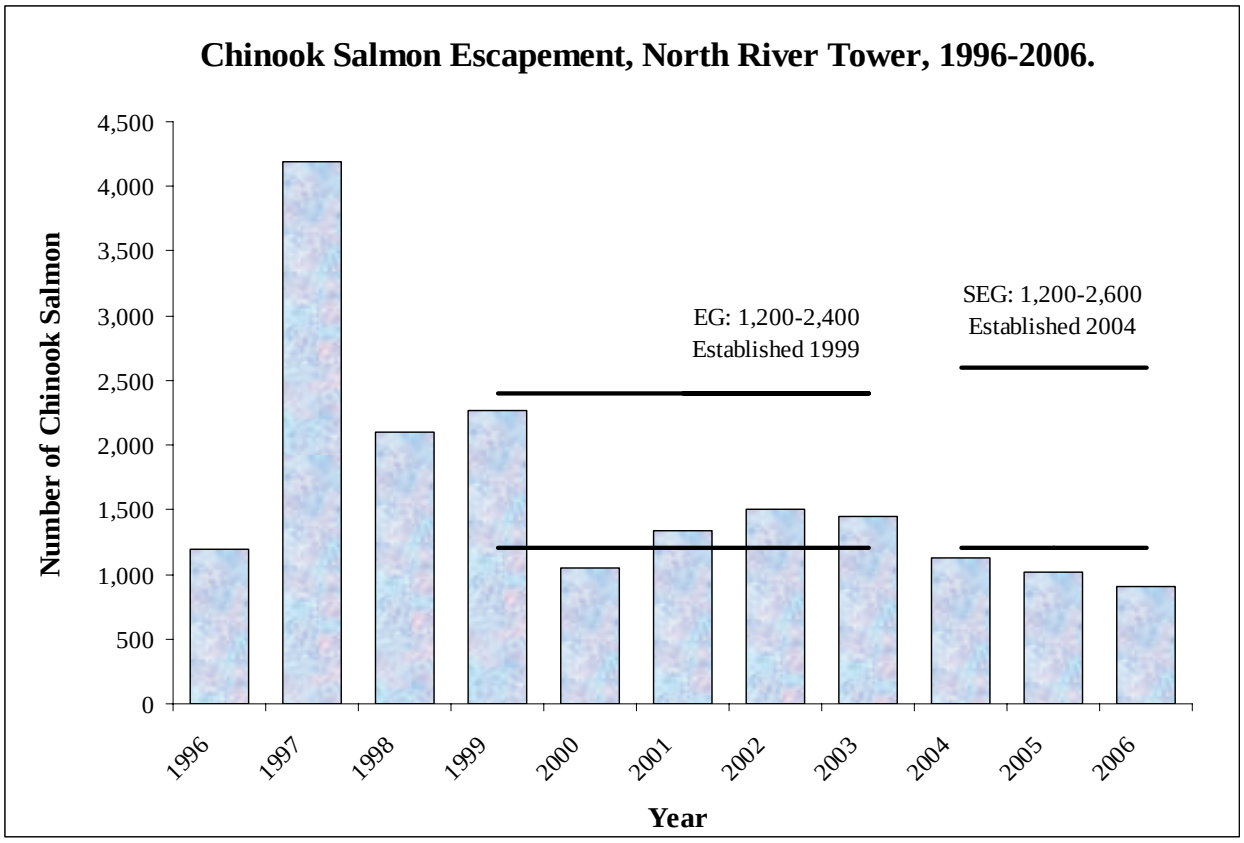
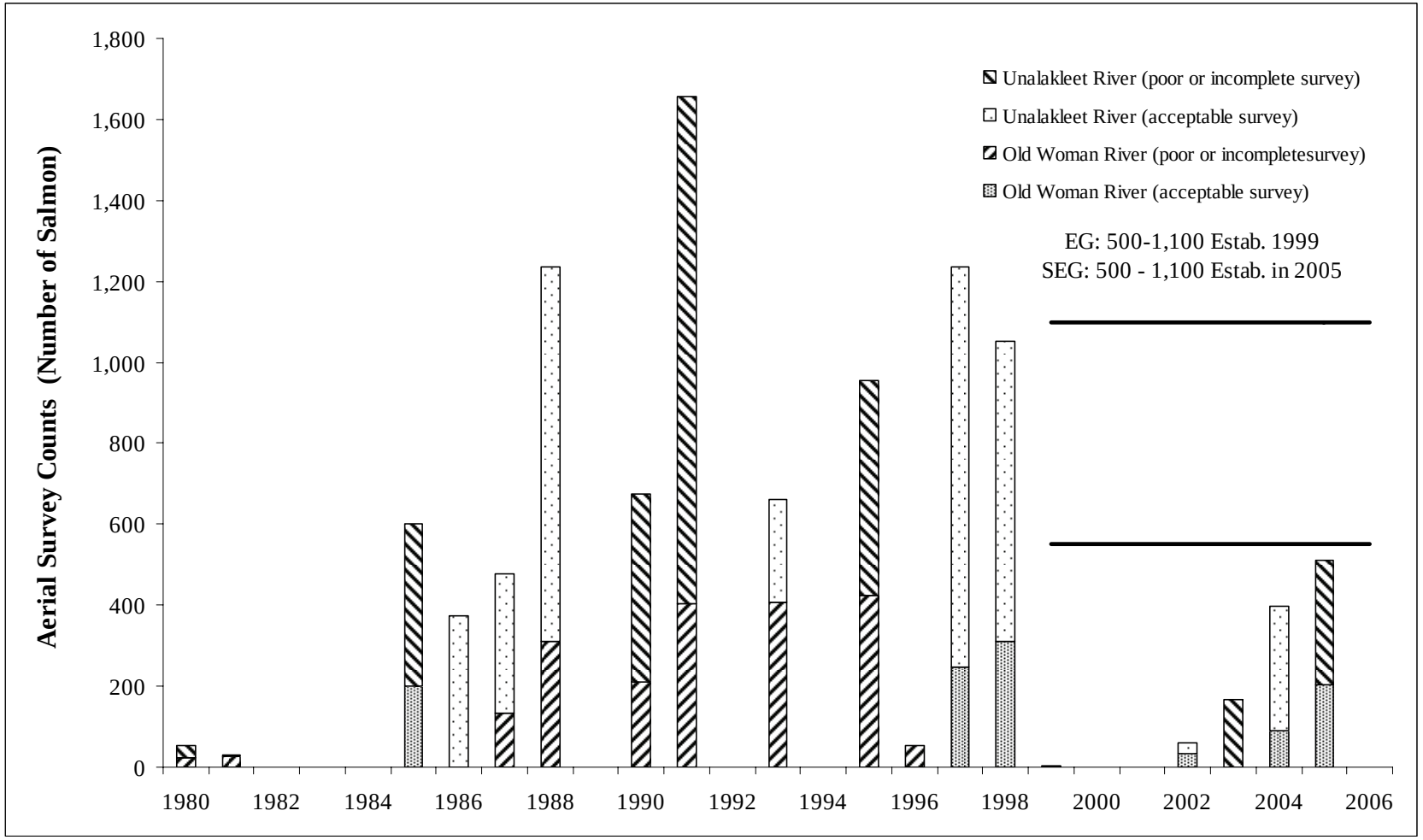


Figure 3.–North River Chinook salmon escapement, 1996–2006.



Note: years with no data indicate the survey was not conducted.

Figure 4.–Unalakleet and Old Woman Rivers Chinook salmon aerial survey counts, 1980–2006.

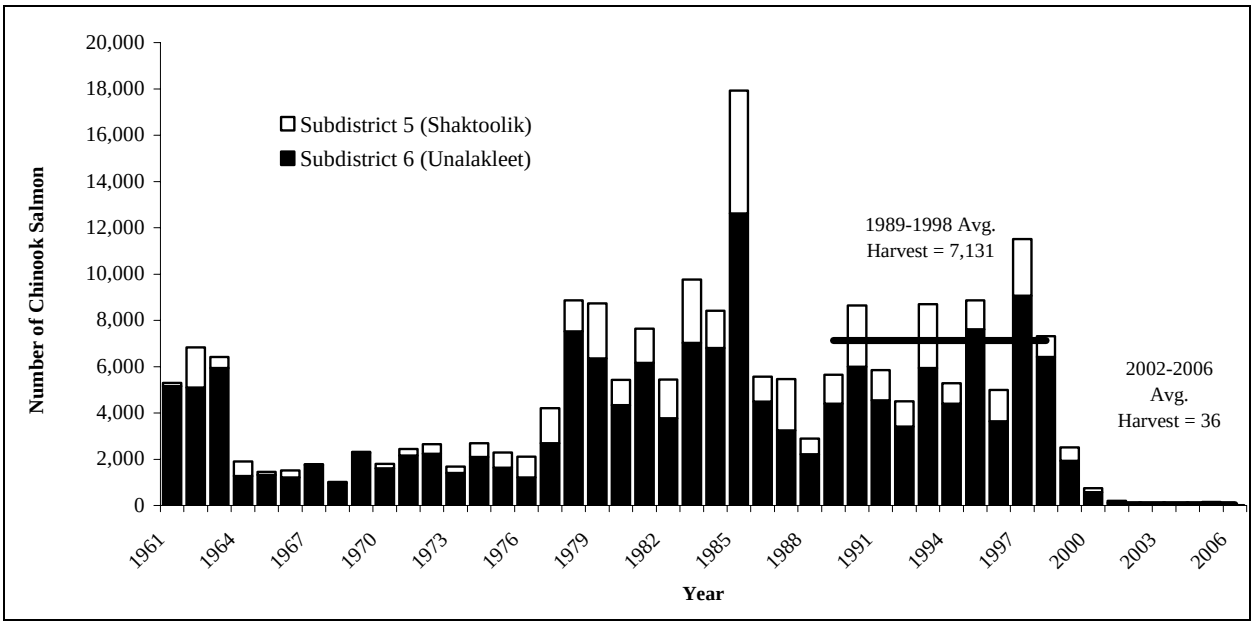
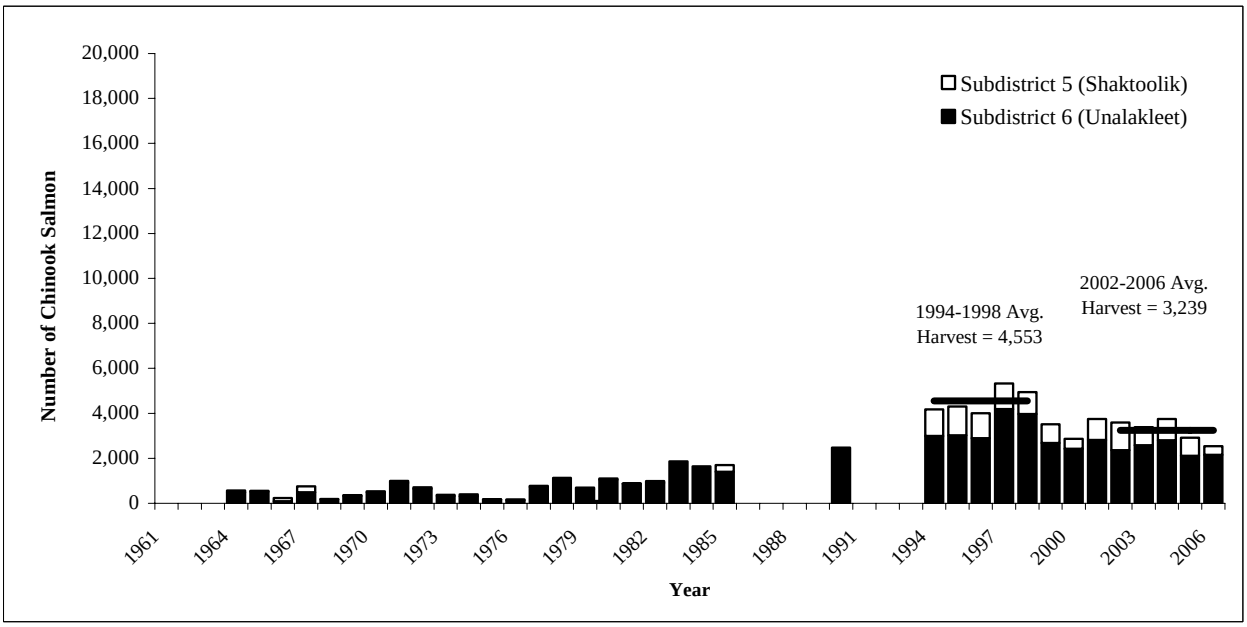


Figure 5.–Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) commercial Chinook salmon harvest, 1961–2006.



Note: Subsistence surveys were not conducted during years with no data.

Figure 6.–Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) subsistence Chinook salmon harvest, 1961–2006.

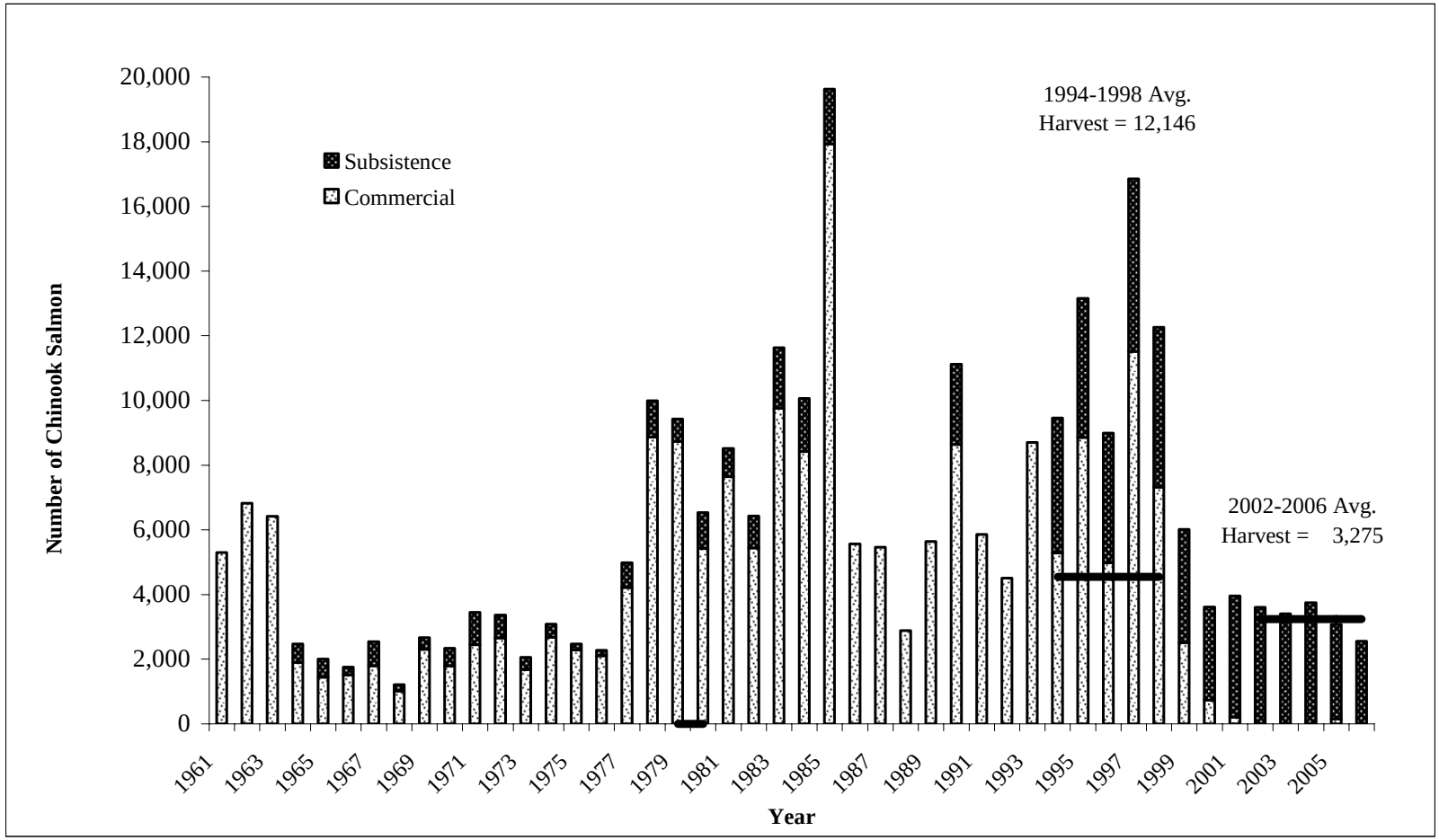


Figure 7.–Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) combined Chinook salmon harvest, 1961–2006.

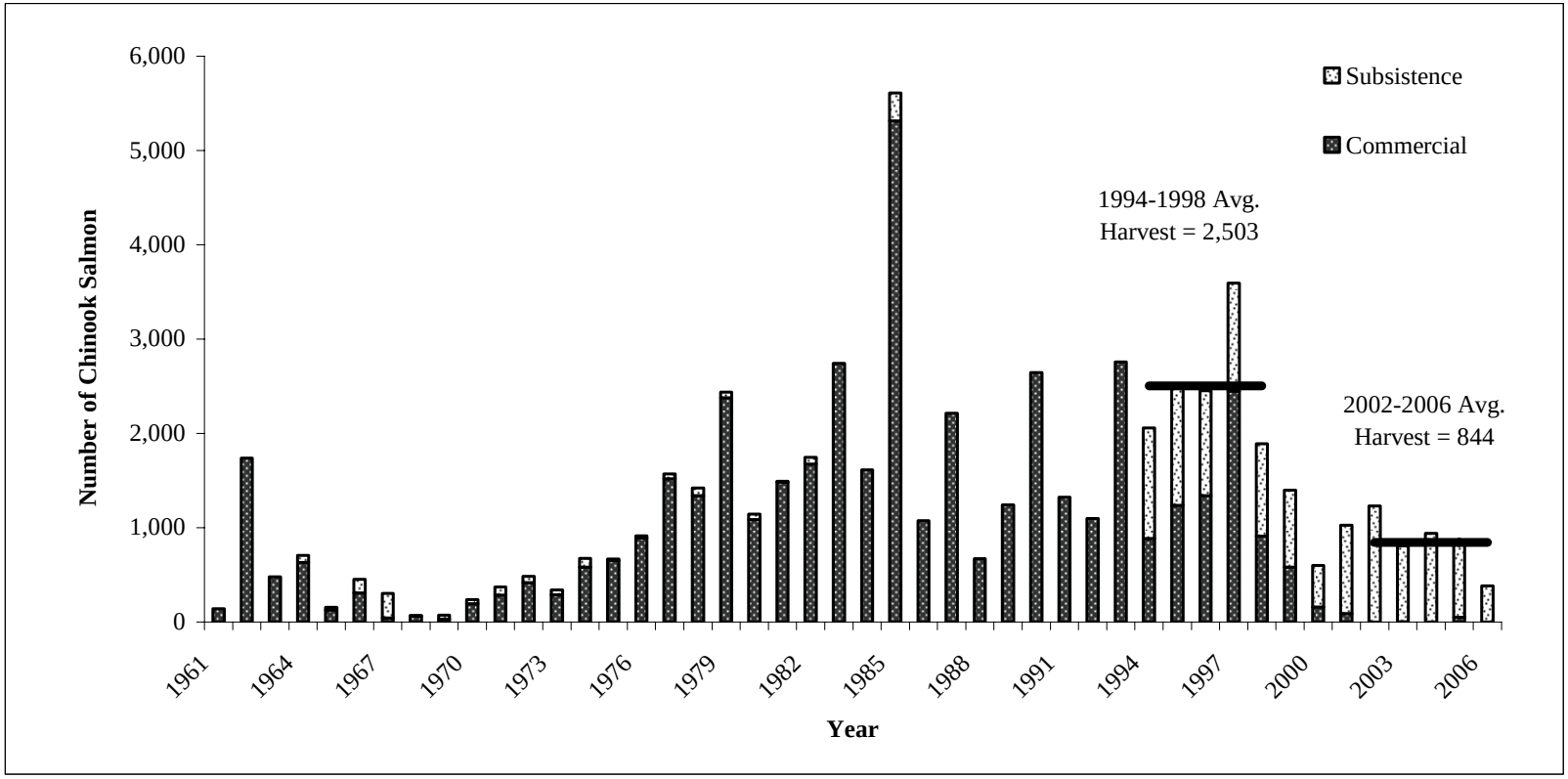


Figure 8.–Subdistrict 5 (Shaktoolik) Chinook salmon harvest, 1961–2006.

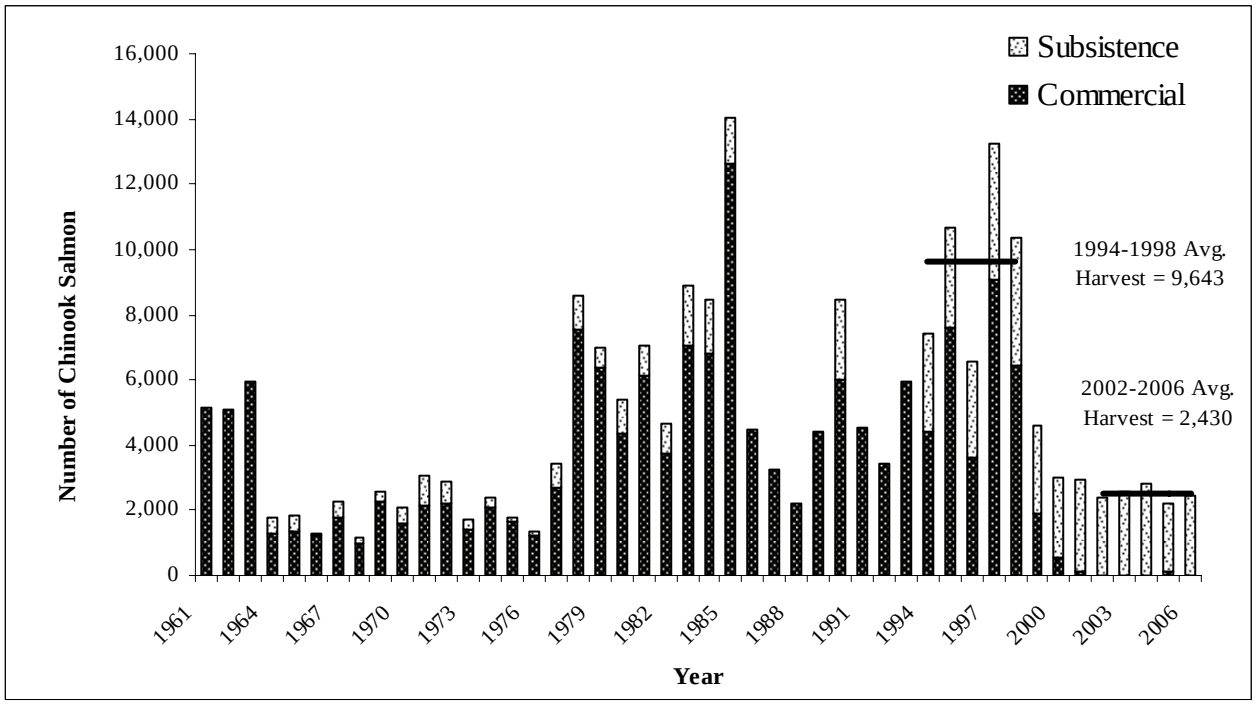
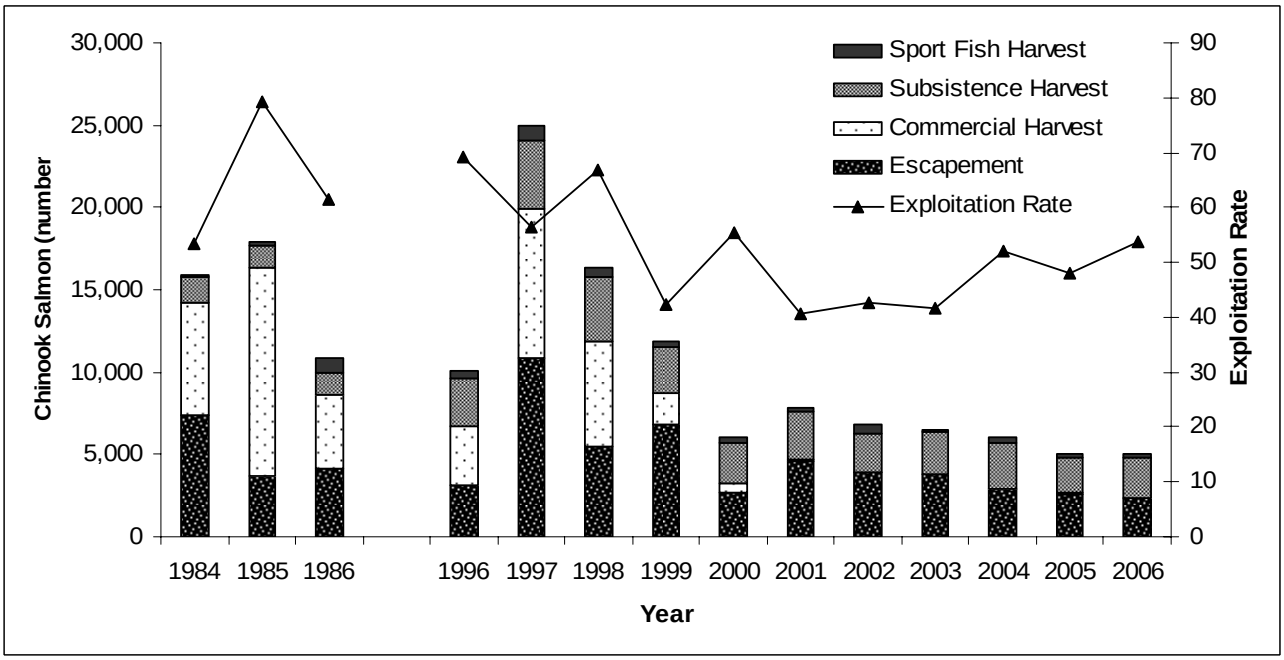
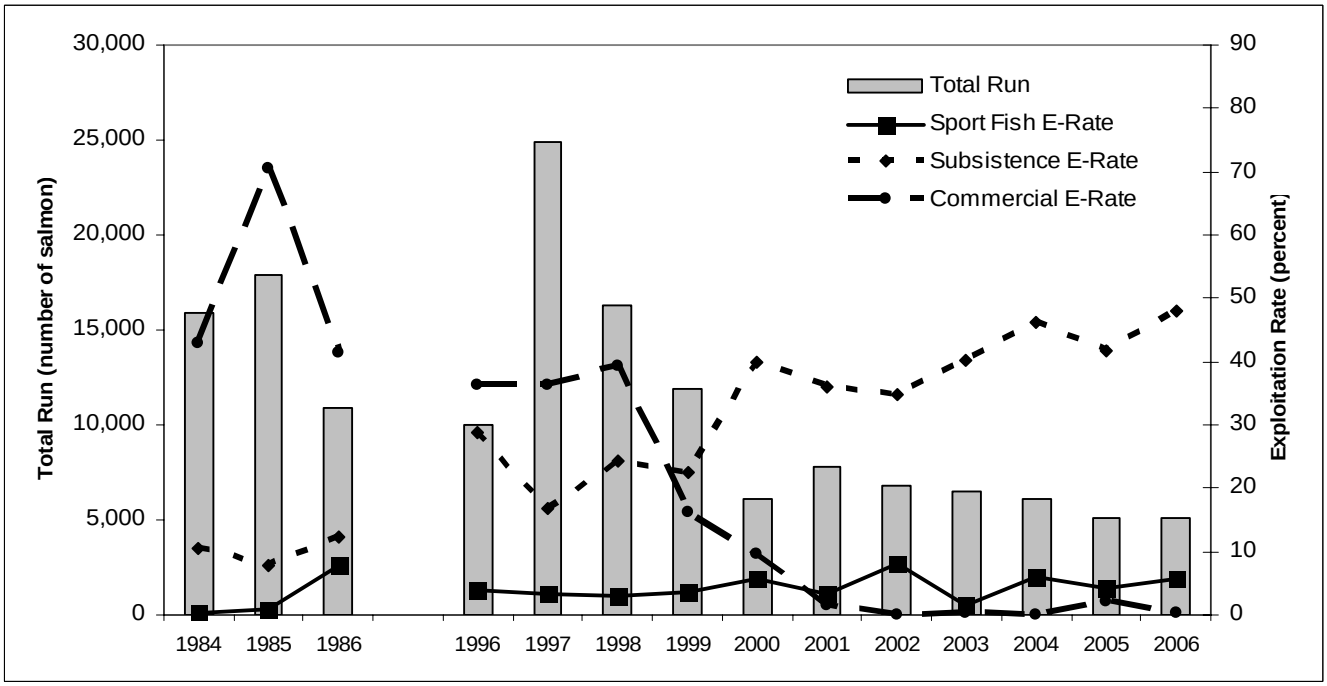


Figure 9.–Subdistrict 6 (Unalakleet) Chinook salmon harvest, 1961–2006.



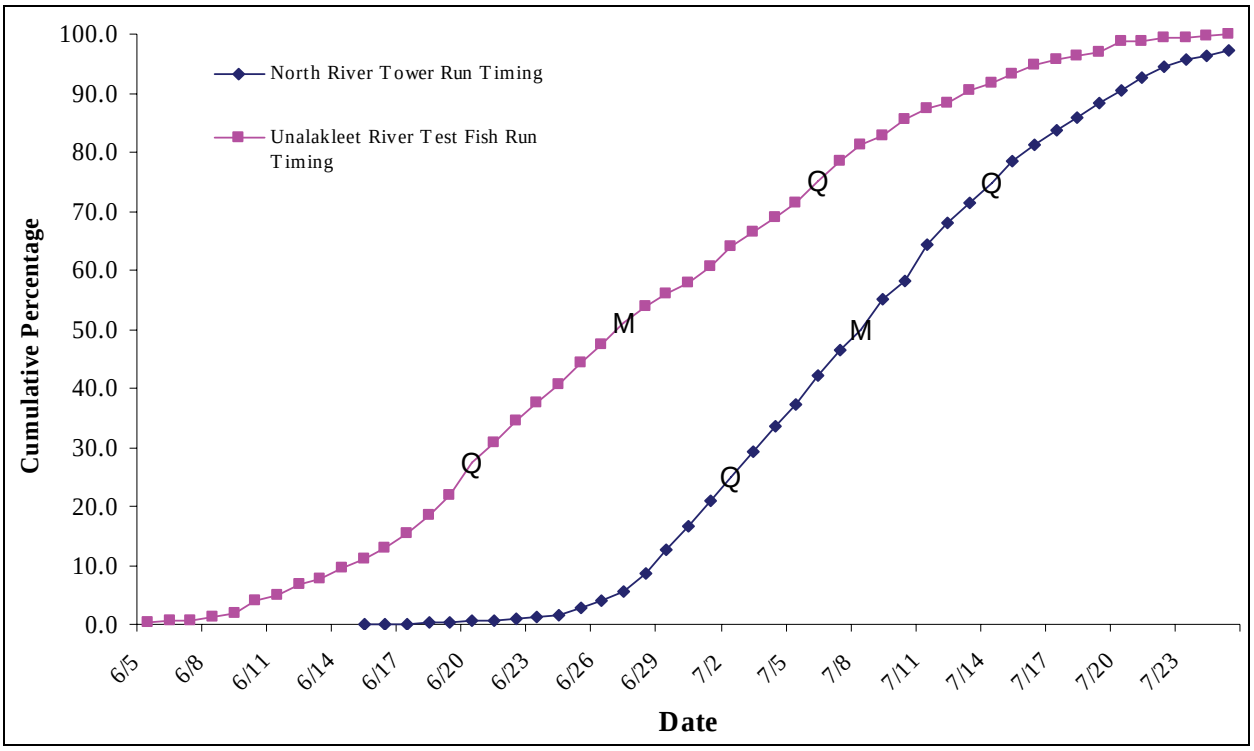
Note: 2006 sport harvest data are preliminary and are based on the previous most recent 5-year average (2001–2005).

Figure 10.–Estimated total run of Unalakleet River drainage Chinook salmon by escapement and harvest, and total exploitation rate, 1984–1986 and 1996–2006.



Note: 2006 sport harvest data are preliminary and are based on the most recent 5-year average (2001–2005).

Figure 11.–Commercial, subsistence, and sport fish exploitation rates and total run for the Unalakleet River Chinook salmon stock, 1984–1986 and 1996–2006.



Note: Q denotes the first and third quartile passage day, while M denotes the median passage day.

Figure 12.–Chinook salmon average run timing cumulative percentage by date for Unalakleet River test net and North River tower, Unalakleet Subdistrict, Norton Sound, 1986–2006.